

## CLAIMS

### WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group  
5 consisting of:

(a) a polynucleotide fragment of SEQ ID NO:1 or a polynucleotide fragment of the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1;

- 10 (b) a polynucleotide encoding a polypeptide fragment of SEQ ID NO:2 or a polypeptide fragment encoded by the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1;

(c) a polynucleotide encoding a polypeptide domain of SEQ ID NO:2 or a polypeptide domain encoded by the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1;

- 15 (d) a polynucleotide encoding a polypeptide epitope of SEQ ID NO:2 or a polypeptide epitope encoded by the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1;

- (e) a polynucleotide encoding a polypeptide of SEQ ID NO:2 or the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID  
20 NO:1, having biological activity;

(f) a polynucleotide which is a variant of SEQ ID NO:1;

(g) a polynucleotide which is an allelic variant of SEQ ID NO:1;

- (h) an isolated polynucleotide comprising nucleotides 518 to 1504 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 minus the start  
25 codon;

(i) an isolated polynucleotide comprising nucleotides 515 to 1504 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 including the start codon;

- 30 (j) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:1; and

(k) a polynucleotide capable of hybridizing under stringent conditions to any one of the polynucleotides specified in (a)-(j), wherein said polynucleotide does not

hybridize under stringent conditions to a nucleic acid molecule having a nucleotide sequence of only A residues or of only T residues.

2. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding a G-protein coupled receptor protein.

3. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises a nucleotide sequence encoding the sequence identified as SEQ ID NO:2 or the polypeptide encoded by the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1.

4. The isolated nucleic acid molecule of claim 1, wherein the polynucleotide fragment comprises the entire nucleotide sequence of SEQ ID NO:1 or the cDNA sequence included in ATCC Deposit No: PTA-2766, which is hybridizable to SEQ ID NO:1.

5. The isolated nucleic acid molecule of claim 2, wherein the nucleotide sequence comprises sequential nucleotide deletions from either the C-terminus or the N-terminus.

6. The isolated nucleic acid molecule of claim 3, wherein the nucleotide sequence comprises sequential nucleotide deletions from either the C-terminus or the N-terminus.

7. A recombinant vector comprising the isolated nucleic acid molecule of claim 1.

8. A method of making a recombinant host cell comprising the isolated nucleic acid molecule of claim 1.

9. A recombinant host cell produced by the method of claim 8.

10. The recombinant host cell of claim 9 comprising vector sequences.

11. An isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-2766;

(b) a polypeptide fragment of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-2766, having biological activity;

(c) a polypeptide domain of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-2766;

(d) a polypeptide epitope of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-2766;

5 (e) a full length protein of SEQ ID NO:2 or the encoded sequence included in ATCC Deposit No: PTA-2766;

(f) a variant of SEQ ID NO:2;

(g) an allelic variant of SEQ ID NO:2;

(h) a species homologue of SEQ ID NO:2;

10 (i) a polypeptide comprising amino acids 2 to 330 of SEQ ID NO:2, wherein said amino acids 2 to 330 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;

(j) a polypeptide comprising amino acids 1 to 330 of SEQ ID NO:2; and

(k) a polypeptide encoded by the cDNA contained in ATCC Deposit No.  
15 PTA-2766.

12. The isolated polypeptide of claim 11, wherein the full length protein comprises sequential amino acid deletions from either the C-terminus or the N-terminus.

13. An isolated antibody that binds specifically to the isolated polypeptide  
20 of claim 11.

14. A recombinant host cell that expresses the isolated polypeptide of claim 11.

15. A method of making an isolated polypeptide comprising:  
25 (a) culturing the recombinant host cell of claim 14 under conditions such that said polypeptide is expressed; and

(b) recovering said polypeptide.

16. The polypeptide produced by claim 15.

17. A method for preventing, treating, or ameliorating a medical condition, comprising administering to a mammalian subject a therapeutically effective amount  
30 of the polypeptide of claim 11 or the polynucleotide of claim 1.

18. A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or absence of a mutation in the polynucleotide of claim 1; and

(b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or absence of said mutation.

5           19.     A method of diagnosing a pathological condition or a susceptibility to a pathological condition in a subject comprising:

(a) determining the presence or amount of expression of the polypeptide of claim 11 in a biological sample; and

10           (b) diagnosing a pathological condition or a susceptibility to a pathological condition based on the presence or amount of expression of the polypeptide.

          20.     A method for identifying a binding partner to the polypeptide of claim 11 comprising:

(a) contacting the polypeptide of claim 11 with a binding partner; and

15           (b) determining whether the binding partner effects an activity of the polypeptide.

          21.     The gene corresponding to the cDNA sequence of SEQ ID NO:2.

          22.     A method of identifying an activity in a biological assay, wherein the method comprises:

(a) expressing SEQ ID NO:1 in a cell;

20           (b) isolating the supernatant;

(c) detecting an activity in a biological assay; and

(d) identifying the protein in the supernatant having the activity.

          23.     The product produced by the method of claim 20.

25           24.     A process for making polynucleotide sequences encoding a gene product having altered G-protein coupled receptor activity comprising,

a) shuffling a nucleotide sequence of claim 1;

b) expressing the resulting shuffled nucleotide sequences and,

c) selecting for altered G-protein coupled receptor activity as compared to the G-protein coupled receptor activity of the gene product of said unmodified nucleotide sequence.

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25. The process of claim 24, wherein the nucleotide sequence is any one of the sequences selected from the group consisting of SEQ ID NO:1, 29, and 54.
26. A shuffled polynucleotide sequence produced from the process of claim 25.
27. An isolated nucleic acid molecule consisting of a polynucleotide having a nucleotide sequence selected from the group consisting of:
- (a) a polynucleotide encoding a polypeptide of SEQ ID NO:2;
  - (b) a polynucleotide comprising nucleotides 518 to 1504 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 minus the start codon;
  - (c) a polynucleotide comprising nucleotides 515 to 1504 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 including the start codon;
  - (d) a polynucleotide encoding the HGPRBMY11 polypeptide encoded by the cDNA clone contained in ATCC Deposit No. PTA-2766;
  - (e) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:1;
  - (f) a polynucleotide encoding a polypeptide of SEQ ID NO:30;
  - (g) a polynucleotide comprising nucleotides 4 to 1038 of SEQ ID NO:29, wherein said nucleotides encode a polypeptide of SEQ ID NO:30 minus the start codon;
  - (h) a polynucleotide comprising nucleotides 1 to 1038 of SEQ ID NO:29, wherein said nucleotides encode a polypeptide of SEQ ID NO:30 including the start codon;
  - (i) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:29;
  - (j) a polynucleotide encoding a polypeptide of SEQ ID NO:55;
  - (k) a polynucleotide comprising nucleotides 4 to 1023 of SEQ ID NO:54, wherein said nucleotides encode a polypeptide of SEQ ID NO:55 minus the start codon;

- (l) a polynucleotide comprising nucleotides 1 to 1023 of SEQ ID NO:54, wherein said nucleotides encode a polypeptide of SEQ ID NO:55 including the start codon; and
- (m) a polynucleotide which represents the complimentary sequence (antisense) of SEQ ID NO:54.
28. The isolated nucleic acid molecule of claim 27, wherein the polynucleotide comprises a nucleotide sequence encoding a G-protein coupled receptor protein.
29. The isolated nucleic acid molecule of claim 27, wherein the polynucleotide fragment comprises a nucleotide sequence encoding the polypeptide sequence identified as SEQ ID NO:2, 30, or 55.
30. The isolated nucleic acid molecule of claim 28, wherein the nucleotide sequence comprises sequential nucleotide deletions from either the C-terminus or the N-terminus.
31. A recombinant vector comprising the isolated nucleic acid molecule of claim 28.
32. A recombinant host cell comprising the recombinant vector of claim 31.
33. An isolated polypeptide consisting of an amino acid sequence selected from the group consisting of:
- (a) a polypeptide fragment of SEQ ID NO:2 having G-protein coupled receptor activity;
- (b) a polypeptide domain of SEQ ID NO:2 having G-protein coupled receptor activity;
- (c) a full length protein of SEQ ID NO:2;
- (d) a polypeptide corresponding to amino acids 2 to 330 of SEQ ID NO:2, wherein said amino acids 2 to 330 comprise a polypeptide of SEQ ID NO:2 minus the start methionine;
- (e) a polypeptide corresponding to amino acids 1 to 330 of SEQ ID NO:2;
- (f) a polypeptide encoded by the cDNA contained in ATCC Deposit No. PTA-2766.

- (g) a polypeptide fragment of SEQ ID NO:30 having G-protein coupled receptor activity;
- (h) a polypeptide domain of SEQ ID NO:30 having G-protein coupled receptor activity;
- 5 (i) a full length protein of SEQ ID NO:30;
- (j) a polypeptide corresponding to amino acids 2 to 346 of SEQ ID NO:30, wherein said amino acids 2 to 346 comprise a polypeptide of SEQ ID NO:30 minus the start methionine;
- 10 (k) a polypeptide corresponding to amino acids 1 to 346 of SEQ ID NO:30;
- (l) a polypeptide fragment of SEQ ID NO:55 having G-protein coupled receptor activity;
- (m) a polypeptide domain of SEQ ID NO:55 having G-protein coupled receptor activity;
- 15 (n) a full length protein of SEQ ID NO:55;
- (o) a polypeptide corresponding to amino acids 2 to 341 of SEQ ID NO:55, wherein said amino acids 2 to 341 comprise a polypeptide of SEQ ID NO:55 minus the start methionine; and
- 20 (p) a polypeptide corresponding to amino acids 1 to 341 of SEQ ID NO:55.
34. A method of screening for candidate compounds capable of binding to and/or modulating activity of a G-protein coupled receptor, comprising:
- 25 a.) contacting a test compound with a substantially or partially purified polypeptide according to claim 28; and
- b.) selecting as candidate compounds those test compounds that bind to and/or modulate activity of the polypeptide.
35. The method according to claim 34, wherein the candidate compounds are small molecules.
- 30 36. A cell comprising NFAT/CRE and the polypeptide of claim 11 or 33.

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37. A cell comprising NFAT G alpha 15 and the polypeptide of claim 11 or 33.
38. A method of screening for candidate compounds capable of modulating activity of a G-protein coupled receptor-encoding polypeptide, comprising:
- (a) contacting a test compound with a cell or tissue expressing the polypeptide according to claim 11 or 33; and
- (b) selecting as candidate modulating compounds those test compounds that modulate activity of the G-protein coupled receptor polypeptide.
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39. The method according to claim 38, wherein the candidate compounds are agonists or antagonists of G-protein coupled receptor activity.
40. The method according to claim 39, wherein the polypeptide activity is associated with the heart.
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41. The method according to claim 40, wherein the candidate modulating compounds are peptides.